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The vanishing Caracal

—Photo by Ashok Singh



Members and Subscribers are requested to note that all yearly subscriptions fall due on 1st of April each year. They are requested to pay in time so that Cheetal may be sent to them regularly.

Change of address should be intimated at the earliest to prevent Cheetal being lost in transit.

Honorary Secretary.

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Members' Page

His Excellency Shri Fakbruddin Ali Ahmad, President of India, has graciously consented to be the Chief Patron of the Wild Life Preservation Society of India in succession to Shri V.V. Giri, his predecessor in Office. The Society is grateful to him and looks forward to his active patronage and advice. Under his patronage the Society hopes to grow from strength to strength to save our fast vanishing wildlife heritage.

The Society congratulates its member Dr. C.D. Deshmukh on the honour of Padma Bhushan being conferred on him by the President of India on the occasion of the Republic Day.

The Society also congratulates its Life Member Shri Arjan Singh of Tiger Haven on the conferment of the distinction of Padma Shri by the President of India in recognition of his work in the cause of wild life conservation.

The Society congratulates its knowledgeable member Shri Ruben David of Ahmedabad on the honour of Padma Shri being conferred on him for his outstanding work for wild life particularly in the management of Zoos.

We hope that they will all continue to work for wildlife conservation to make it a reality from a dream that it at present is.

Members are requested to note that annual subscription falls due on the 1st of April each year and Cheetal is sent only when subscription is received. Reminders have been sent and all arrears of subscriptions must be sent at the earliest to enable the Society to do its normal work in the cause of wildlife conservation.

Members are also requested to note that other members are interested in their wild-life work, excursions, observations, photographs and in all that they have been doing for wildlife conservation. This can be possible if members write to the Society and their activities are published in Cheetal. All are requested to send suggestions for improvement.

Wild life conservationists are in a minority but in a democracy, strength lies in numbers and so all members and readers of Cheetal are requested to enroll at least one member every year so that our membership may increase in geometrical progression.

Members are requested to notify change of address at the earliest so that correspondence and Cheetal is not lost in transit.

Student members are requested to write articles on any aspect of wildlife conservation, wildlife tourism and their experiences of nature and wildlife. There is a prize every year for the best article by a student member published in Cheetal.

News and Notes

Dr. Karan Singh, Chairman Indian Board for Wildlife and Chairman Project Tiger has accepted on behalf of the Government of India from the Society a present of new .12 Bore D.B.B.L. Shot guns and .315 Magazine Rifles worth more than Rs. 50,000 at the present controlled price for anti-poaching work in Ranthambhore (Rajasthan), Kanha (Madhya Pradesh), Sunderbans (West Bengal) and Manas (Assam). The Society had already presented three weapons to Bihar for antipoaching work in Palamau and Hazaribagh National Park. We hope that this will go a long way in giving courage to the wildlife staff who work at the risk of their lives against poachers who are often better armed. The Society had earlier received a donation of Rs. 24,000/- from a West German Zoological Society through Dr. Griezmiak for which the Society is grateful.

Project Tiger completed two years on 31st March 1975. Part of the million dollars promised by the World Wildlife Fund for saving the tiger in India, Bangladesh and other South Asian countries has been received in India in the shape of Motor vehicles and other equipment. Two speed boats have recently been received for saving the tiger in Sunderbans from the President of World Wildlife Fund on his recent visit to India. School children in Europe raised funds for World Wildlife Fund to save the tiger in India. Some of them came here as guests of the Government of India to see some Tiger Project areas but the tiger refused to oblige then in daylight and they got a glimpse of a tiger while driving at night in one of the sanctuaries. The Government of India will be spending four crore rupees on the Project Tiger in five years. The President of WWF is paying a flying visit to Kanha, Ranthambore and Sunderbans in April. He made an aerial survey of Sunderbans and said that the impenetrable Sunderbans will preserve the tiger for generations to come. A world conference on wildlife is also planned during the next year. The department of tourism, government of India is making vigorous efforts to promote tourism in general and wildlife tourism in particular.

There is a proposal to enclose Keoladeo Ghana bird sanctuary in Bharatpur with a moat or a wall to keep the cattle out so that they do not disturb wildlife and do not compete with deer for grazing.

A part of the Gir Lion sanctuary is being declared a national park. A wall is being constructed to enclose the sanctuary.

A census of tigers is proposed in U.P. this summer.

Maintenance of Wildlife Sanctuaries and Parks (II)

By

S.R. CHAUDHURY I.F.S.

7. Defects due to subjective evaluation, inferences and projections:

Of late, with the working up of massive sentiments that overshadow whatever little scientific acumen we may have regarding wildlife, there is a serious polarisation of subjective opinions which are more often than not far from what is biologically and psychologically true. The genesis of such opinions lies in the mistaken identity that animals are affected the same ways by the same things that we human beings are.

7.1. Because the sound of fellings disturbs us, we feel that it must be disturbing the animals too. Here are a few examples to prove how wrong we may be:

7.1.1. Wild animals in Balimela Dam site (Orissa): In 1959 I saw the dense forests and the open grass lands in the undisturbed valley of river Sileru. There were many animals of many kinds. Their response to the sight of jeep was orientation to novel stimuli, not defensive. 1959—through—1963, I went there occasionally. By 1963 the dam construction was in full swing and the forests were resounding with explosives, machines, vehicles, fellings and the voices of numerous human beings. There were many settlements and much electricity. The animals were there too in spite of the so called disturbing sounds and the supposedly conflicting human activities. The animals got adapted to these novel stimuli which were not associated with pain. Tigers (*Panthera tigris*), Panthers (*Panthera pardus*), wild buffaloes (*Bubalus bubalis*), gaurs, sambers, cheetal, barking deer (*Muntiacus muntjac*), mouse deer (*Tragulus memnina*), wild boar, all were there and their young ones too. 1964—through—1966 my main work site was the submersible area and my headquarters near the main dam. I often watched the behaviours of these wild animals who I still found to be unconcerned with the din and bustle of the much intensified and spread-out work all over the forest. Although many of them got killed by rampant shooting, the residual populations could never acquire defensive response to the shootings because the stimuli used by the hunters were far less intense and frequent than the same kinds impinged on them much more intensely and almost constantly by the construction works. Those living got their young ones as usual, including the tiger, the buffalo and the gaur. Compared to their environmental cacophony fellings in coupes are just whispers.

7.1.2. Objective samplings of equal aged evidences (basically peltect-groups) of deer in and away from the coupes, done by my students, have consistently shown higher densities inside the coupes. Early morning trackings on the extraction paths in use show more frequent fresh hoof marks and foot prints inside the coupes. Animals are often seen in higher densities in coupes particularly under concentrated regeneration fellings and clearings made for plantations. Tigers and panthers are known to have used coupes under logging operation. In may, 1972 I got, in three coupes in Similipal, convincing evidences

of fresh use of dens by tigers, not far from contractors' camps. Sambars are known to have knocked around near the labour camps to lick the used leaf-plates lying scattered in the vicinity of the camps. Vehicles, fellings, labour camps do not disturb the animals. Poaching alone does. The remedy is not suspension of logging. The remedy is prevention of poaching.

7.1.3. In 1970-71 the deer, antelope and gazelle in Sawaimadhopur (now Ranthambor) sanctuary in Rajasthan used to exhibit intense defensive response to the sight and sound of vehicles and artificial lights. Flight distance was high, stampede immediate. By early 1972 this behaviour had shown significant to change. In Kachida valley the jeep could approach the animals, particularly the sambar, within 5 to 10 metres. Spot-light rarely stimulated any somatic change. In six months surreptitious poaching had evidently been effectively controlled in the valley by Fateh Singh, one of my students posted there as Wildlife Warden.

7.2. Where poaching is controlled, forestry fellings generally improve range conditions. Paradoxically it is not so much the poaching as the fellings that are condemned. This happens because psychologically people are 'selective readers'. They will not pay attention nor remember facts which conflict with their preconceptions. What they accept is 'selective retention'.

7.2.1. The black-tailed deer population increased rapidly in west coast (U.S.A.) douglas fir following logging (Brown 1961). From a mere 10 deer per square mile the population rose to 30 per sq. mile by the 10th year, 60 per sq. mile by the 15th year and 75 per sq. mile by the 20th year, after which the decline started again as the trees got congested to finally push down the population back to 10 per sq. mile by the 40th to 50th years after logging.

7.2.2. Increase in deer populations in many felled areas is common experience in this country. Such increase in some coupes has caused regeneration problems due to heavy browsing. Expensive fences have been installed in many to protect the regeneration. In a few cases culling has been resorted to. And at least in one case—Ranthambor sanctuary in Rajasthan—the deer and nilgai have been entertained to mow down the coppice regeneration and stagnate the regrowth at field level ... Place these biological findings before the people. Tell them that ecologically fellings are necessary. Tell them also that if regeneration is affected, repellents including some shooting are also necessary. The very idea will be revolting to them just because emotionally they have been implanted with the preconception that strongly opposes fellings and killings. It happens with many of us too, disciplined professionals.

7.3. We see the cattle grazing in grass lands. We see them browsing leaves from the shrubbery. And we also see the deer and antelopes doing the same thing. Without measuring who is eating how much of what and where, we decide that because the cattle is doing the same pattern of jaw movements in the same pose and in similar plant structure as do

the deer and antelopes, it must be competing with them. And so, the cattle is branded as an enemy of the wild ungulates. It must leave the sanctuary is the verdict. Actual measurements of inter-species behavioural and functional relationships, however, prove convincingly that the commensalistic role of the cattle is necessary in many of our wildlife ranges including the sanctuaries and the parks. In some, particularly with transition habitat system, cattle form a vital link in the dynamics of the alternating ecosystems. In many advanced countries domesticated livestock have been specifically integrated into wildlife ranges. In East African countries, the levels of co-ordination between wildlife and the cattle are being worked out in many ranges and in some already established. Let us see how it happens in our country.

7.3.1. Under the open tree stands in Periyar, the ground cover is thick tall grass. My students took some random lineal transects through the grass in late December, 1972. In the grass we came across patches cut to ground level. It was not a human act. Evidently the gaur (a wild bovine) had done it. On an evening trek we found a herd of gaurs actually grazing on this coarse grass. Fresh growth in the cutback tufts were tender blades. Sambar pellets were significantly frequent in such patches. Except on game trails no sambar pellet was found in the thick tall grass. The gaur-sambar interrelationship is easily guessed. The evidence holds a lead to suspect similar benefits from the cattle to other tender grazers among the wild animals.

7.3.2. Masinaguda area with its Jaydev avenue in Mudumalai sanctuary in Tamilnadu is famous for the large herds of cheetals—sometimes stag parties of over 250 (per com. Krishnan)—that are frequently seen. This again is the area under heavy pressure of grazing by cattle. The habitat formations in this terrestrial system are maintained by the cattle as 'open ground' type, interspersed with some scattered patches of 'field type', sporadic trees and peripheral 'wood land', ideal for cheetal and nocturnal use by sambar. Take the cattle out, the grass will grow tall, thick, coarse and dense as is found elsewhere in the sanctuary, areas out of bounds for the cattle. Evidences of deer in these tall grasses are thin and sporadic except in few scattered open patches made and maintained by the bovine gaur. Pellet—groups sampling by my students with the sanctuary staff—systematic one metre wide strips with 30 steps breakups—done on January 3, 1973 suggested an average density of 1.2 pellet-groups per millihectare dropped in 95 days $\times$ O. 75 $\times$ number of deer using the Masinaguda area, approximately one (1.09) deer per hectare. The density of deer appeared to be high compared to such measurements in similar areas elsewhere in the country. Overuse—*Cassia tora* and *Solanum* sp.—in some pockets indicated the need for suitable reduction of cattle pressure and removal of the annual turnover in cheetal. The synecological efficiency of regulated mixture of bovine and deer species is, however, evident.

7.3.3. Objective measurements of evidences by my students, in Tadoba National Park (Maharashtra) and Sariska sanctuary in heavy grassy areas showed that grazing of tenderer

regrowth by deer occurred only in patches from which the coarse grass had been cut and removed by human agency. It could be a method for replacing direct use by the cattle, but the total man-days involved would not be economically commensurate with the quality of local cattle that would be benefited by such export. Moreover, the nutrients that would have been recycled through the dung dropped in the range by direct use would also be exported in the cut grass.

7.3.4. As mentioned earlier (under reference 6.3) the most significant change in range conditions with the increase in the densities of cattle and wild ungulates is seen in the Chila-Khara forests of Lansdowne Division in U.P. Before 1970 the gujars' influence favoured the range dynamics. The density of cattle was low. The resultant coordination of the interacting factors and influences was an accidental alignment for better integrated benefits from a range which is poor in timber but rich in animals. Production of milk was more than 30 kilograms per hectare. Turnover in deer was nearabout 50%. In 1970 the average density of pellet-groups in April-May was one per millihectare. By 1973 it rose to between 3 to 5.5 per millihectare in February-March. Both cattle and wild ungulates increased disproportionately. The overpopulation is evident from the deterioration in the range condition.

7.3.5. Similar is the case of the present malfunction between the 'maldhari' (grazier) cattle and the range in the Gir sanctuary of Gujarat, the result of overshooting the limits far in excess of the carrying capacity. Complete removal of the cattle will seriously hamper the resource utilisation by the existing wild ungulates alone. The total ungulates biomass may stagnate at one tenth of the potential. That is why Berwick and Jordan have suggested the introduction of wild bovine and feral cattle to replace the domesticated ones which is not practicable. We know: overpopulation of cattle is the main cause of range deterioration. Ungoverned human behaviour is the root of that cause. Resuscitation is possible with knowledgeable control and co-ordinated use by the cattle to promote better resource utilisation and more efficient recycling of the soil nutrients. But, strangely enough, total removal of cattle forms one of the expensive future projects.

7.3.6. In Keoladeo-Ghana (Bharatpur) Bird sanctuary in Rajasthan, the cattle again is wrongly presumed to be a conflicting structural component. As predicted by this author (1970-71) functional results in a cattle enclosure proved the falacy of the presumption. Although the deer and the antelopes could easily enter the enclosure they never did. The pressure got too thick and coarse for them. Reentrance of cattle normalised the appropriate utilisation. But more important, however, is the role of cattle in the fast recycling of the nutrients through the alternating ecosystems, aquatic in rains—through-winter, and terrestrial in summer. In this transition habitat system the cattle, particularly the buffaloes, consume vast quantities of the submerged and emergent vegetation. In summer the close crop the grass on the dry surface of the same land. Their dung form rich manure both for the plants and planktonic growths, the two vital bases of the major

resource matrices. The animal biomass per unit area carried by the ecosystems is highest in the country mainly because of the cattle. And yet, elimination of cattle is defined as the major problem.

8. Defect in branding the local man as an environmental pathogen:

This is the worst of all defects, and saddest of social approach. In objective 4.4. of the Tiger Project the word 'sterilisation' has been written in connection with human use of the tiger sanctuary, the project area. Sterilisation relates to pathogens. Human beings are not environmental pathogens. The projection is from a foreigner's view on the scantily clad underfed local man. On the contrary the rural man is a structural component of the ecosystems in our forests, including the sanctuaries and parks. His role is often an important factor in the total function. He has to be integrated into the system by regulation to promote welfare and minimise decimation.

8.1. — A large proportion of the rural people in and near the forests depend on the natural resource for a sizeable portion of their annual food—the tubers, fruits, flowers and leaves etc. They usually go unarmed to get their grub without any significant niche-overlap on the wild herbivores. They, evidently, do not cause any conflict with the wild animals.

8.2. The local man collects specific roots, fruits flowers, leaves, gum, resin, honey, wax and other minor forest produce for earning some cash. He behaves the same way as he does for his food. He should not be condemned on baseless suppositions.

8. Summary of diagnosis:

The attempt so far has been to involve you in a broad visualisation of the living mechanism in our wildlife sanctuaries and parks, and to draw your attention to the guiding objectives and basic concepts as influenced by subjective inferences, and the resultant defects in the treatments. Before I proceed further let me summarise the preceding data.

9.1. The guiding objectives are:

9.1.1. to perpetuate natural biota, primordial natural areas and areas of unusual scenic beauty;

9.1.2. to preserve and reestablish rare and threatened species;

9.1.3. to provide for the evaluation of the change in the primordial structural and functional properties by the application of various kinds and grades of consumptive uses, and

9.1.4. to promote specific nonconsumptive use and scientific studies.

9.2. The basic concepts, subjective inferences and consequent prescriptions for the creation and maintenance of our wildlife sanctuaries and parks are as follows.

9.2.1. Allow nature without interference to take its own course. It will stabilise with a natural balance and bear the pristine look. The prescriptions for it are:

- A. remove the (supposedly) disturbing elements—fellings, grazing and other consumptive use by human beings.
- B. eliminate poaching, and
- C. control cattle borne disease in the vicinity of the sanctuaries and parks.

9.2.2. Develop pockets of animal concentration to increase the sale value of bio-aesthetics. The treatments prescribed are:

- A. make clearance to open out view and promote ground fodder;
- B. provide salt, water and sometimes attractive food;
- C. construct watch towers, and
- D. develop tourist centres and camps with modern amenities and transport facilities.

9.3. The guiding objectives and basic concepts are the accepted standards for discrete application according to the properties of the area dealt, its biota and the nature of factors and influences that govern its natural system. The treatment necessary should be based on objective data, not unconfirmed presumptions. Factual analysis of happenings, which I have done, leads us to suspect that the principles and practices applied to our wildlife sanctuaries and parks may not be (often are not) sized to our land, its climate and its people. The treatment, therefore, may actually hamper rather than help the total function.

9.3.1. Application of the American concept of climatic climax combined with the attempt to replicate also the East African feature of arrested savanna has led to serious structural and functional imbalances in many of our sanctuaries and parks.

- A. Small pockets under non-consumptive use inside a large area of no recognised use may affect disproportionately the basic 'law of interspersion', the core of dynamic community function.
- B. Artificial ingestive attractions in such pockets may increase the discord.
- C. Deficiency in proper understanding of the biotic properties, dynamics and behaviours of populations and consequent lack of confidence in proper manipulation may cause violent population oscillations. It may result in drastic physiognomic and structural changes with unnecessary waste of consumptive returns.

9.3.2. Subjective evaluations, inferences and projections may lead to improper and uneconomic land use due to elimination of fellings, grazing and human beings with

no corresponding ecological gain but actual dampening of the range dynamics and loss in the utilisation of the trophic resources.

10. Need for reorientation:

That a considerable reorientation of our present approach to the maintenance of wildlife sanctuaries and parks is necessary is apparent from the foregoing analysis. We have already lost a quarter of a century in trying to get the proper focus on the future.... At the turn of the century approach to wildlife conservation in the States was no different from what it is with us today. They were lucky to have Theodore Roosevelt as their president, his trusted advisor Gifford Pinchot and other farsighted men like Wesley Powell and Frederick H. Newell. These men considered the 'forever wild' clause as an unprogressive step away from scientific management. They favoured 'conservative exploitation' based on the Rooseveltian doctrine, 'conservation through wise use'..... Aldo Leopold, the father of wildlife science in the States, came next with his practical approach to integrate the land, its biota and its people "..... by the creative use of the same tools which hitherto destroyed it—axe plow, cow, fire, and gun". For he said, "The hope of the future lies not in curbing the influence of human occupancy—it is too late for that—but in creating a better understanding of the extent of the influence and a new ethics for its governance". Professor Leopold's thesis has stood the test of time. It is confirmed by the results in the advanced countries. It is being proved by the East African countries. We should follow that proved path.

10.1. In doing so, surely the most important first step is to know where we stand, not by subjective presumptions but actual objective measurements, not with sophisticated in depth details but, at this moment, through simple broad pattern methodologies applicable with the available man power. Some of these have been evolved or adapted during the field excercises of my students. Others will be developed as we start working methodically..... For example, it is easier to watch a large number of tigers by their individually recognisable pugmarks through many trained eyes even of the illiterate persons than to try to harness a few with telemetric equipments and trace them through equally expensive experts who would not be able to pinpoint any within the 'error-polygons' spreading across the hills and dales of the tiger land in this country... .. The point is, we are apt to be carried away by the comfortable ways with the elephants, vehicles, even aeroplanes (i) and the aura of expensive remote-sensing equipments. Such would not be the correct step. We have to prepare our 'range inventories' by actual ground survey and specific structural measurements similar to our stock-mappings. We have to design and document spatio-temporal measurements of populations and their interrelated functions in the range, different habitat formations and specific habitat types. We would then be able to evaluate the structural and functional interrelationships with the interacting factors and influences, including that of the local man. Comparative values from similar biomes under differential interactions of factors and influences would provide us the the basis for the predictable

control of the future structure and function. It is not very different from what we have done in evolving our silvicultural practices. Here is a step further for us to take the animals too and thus maintain the total biota. Maintenance could then be purposeful with tending, thinning, weeding, and if necessary planting too, both for the habitat and its inhabitants. Systematic evaluation of the responses to treatments would increasingly wise the practice, and its results confirm what Norman Carr says in his book, *The White impala*, that habitat is the key to any wildlife sanctuary: effective wildlife management instead of wasteful control, necessitates carefully planned profitable culling. In essence it is the total ecosystem concept of forestry co-ordinated with wildlife conservation, all the more necessary for the proper maintenance of the wildlife sanctuaries and parks.

10.2. The forester in this country has not appreciated this important aspect of conservation and wise use of the total ecosystem. Indeed, he scarcely realises the immense scope for the beneficial habitat manipulation that could be incidental to the co-ordinated regulation of the natural ecosystem under different silvicultural systems of high or low forests, with defused or concentrated generation fellings. He has not thought of the possibilities for the discrete application of both nonconsumptive and consumptive uses in the same sanctuary or park so that no stand remains outside the direct managerial attention and many more sanctuaries could be formed without putting useful land out of use... We have not thought of it because it appears safer, though unprofessional, to follow the dictates of the poet and the painter, not science nor sense. It is the hard truth of an honest introspection. It is the disheartening experience of this author, a teacher of wildlife science..... This is the crucial time in the sensitivity of the nation for its wildlife when the motivations of future actions should be rationalised by educated farsight. Education to know what and how to investigate, and research to refine the educated interpretations, inferences and projections: this is the ruling need of the moment. It should be fast far flung and basic, starting with the person who already knows quite something about the base of the total structure: he is the forester, both at the technical and the professional levels. Maintenance of wildlife sanctuaries and parks demand much higher degree of disciplined handling than areas purely under intensive productive culture through routine practices... .. Many of the African countries have been lucky to have got the benefit of the devoted works of a number of eminent wildlifers, from advanced countries, scientists who have spent major part of their active lives in the African forests. The local technicians and professionals are being truly trained today in a number of wildlife schools and colleges in the African countries, and they are fast catching up with the advanced countries. Their wisened practices are yielding multifaceted increasing benefits, as stated ealier, perhaps more so in their wildlife sanctuaries and parks..... We need the guidance of such knowledgeable devoted persons, not the graduate and post-graduate foreign students' sketchy dissertations often with wrong inferences and projections of immature experience. Any numeber of wildlife sanctuaries and parks may be created as impressive records, but if we earnestly want to maintain them for the purpose for which they are formed, we must look

for reliable guidance and provide for honest—not pretentious—education.

11. Remedial measures for some heavy decimators:

Pari passu with the programme of reorientation there is pressing need for the control of heavy decimation of wildlife by myopic, largely illegal, human activities. Control these: the populations will bounce back as proved by history.

11.1. Rigid regulation in the use of pesticides is the most urgent. Masked poison or poisons which cannot be detected by the animals, act below the conscious level of the populations. Poisoning is the only single factor—folidol, endrin etc.—which can cause a total clean up, because the residual populations will never be able to acquire any defensive response. Elephants to pigeons, all are being swept by this single agent administered through water salt or food..... I was hoping that we could compulsorily add some taste or small repellents to these poisons. My experiments on elephants have proved that it is easy to cover such repellents by the strong flavour and taste of palatable food I have also found in a series of experiments with tigers in captivity and pie dogs that there is practically no repellent for a hungry cat or dog: anything is gulped if it has some meat or bone..... Possession of pesticides should, therefore, be under stringent legal restriction authorised for storage only in licensed government depots. Pesticides should be used under responsible supervision, subsidised if necessary. Misuse of pesticides should be dealt with by summary trials and long term imprisonment a must for the convicted.

11.2. Like the poisons, the spring traps used on animal trails are equally as effective decimators. Manufacture or possession of such traps should be legally banned.

11.3. Bows and arrows are silent killers. These are no weapons to protect from tigers and elephants. Possession of these inside wildlife sanctuaries and parks should be legally banned.

11.4. Fire-arms are bad decimators mainly at obligatory points like water-holes, salt-licks and feeding grounds. Elsewhere, with adequate 'escape cover', repeated use of fire-arms intensifies defensive response, and success ratio in poaching decreases sharply. All watering places and salt-licks should be identified and frequently checked. In the crop fields bordering sanctuaries and parks, depredation by wild animals should be controlled by repellents, barriers and necessary shooting by the park managements for their annual 'takes'.

11.5. Tribal hunts during their traditional annual festivals should be conducted by park management and the festival subsidised to divert bulk of the festive energy to competition in archery, out-door sports, folk dances and other merry making. The festival may end with the actual conducted hunting in the peripheral forests which will be followed by community feasting with the legally acquired meat from the forest.

12. Limiting factors:

With all other needs adequately available in the range the 'limiting factors' may keep the population at a much lower key than their potential dynamics.

12.1. The crucial limiting factor in most of our wildlife sanctuaries and parks is the water during the summer. Much of the available resource is not consumed because the populations of major ground animals are drawn and localised to the vicinity of the water. Provision of watering places in such ranges should be well planned on the basis of resource distribution, cover conditions and the 'cruising radii' of the related populations. These have to be prior evaluated. Generally water is provided at double the 'cruising radius' of deer—for sambar 1.5 kms as estimated by Bariar (one of my students) in Hazaribag. Watering facilities there, should usually be located at the centres of close placed circles on the map, each with 1.5 km. radius..... Expensive structures should not be made without preliminary utility tests. Such tests can be done with cheap polythene sheet troughs or tanks as designed by this author and successfully used in the Chilla-Khara range in U.P.

12.2. The role of salt is not yet fully understood. It may not have any limiting effect. When provided artificially in the range, it should be made like natural salt-licks on the side of a cutting so that the animals lick it higher than their hooves.

12.3. Inadequate cover may have specific or general limiting effect. The predator ambushes its prey by taking help of a cover. An alerted prey saves its life by escaping into cover. And, both need cover for their young ones. Often they may also seek physiological cover for protection against intolerable cold, heat or other physical conditions. Manipulation or creation of physiological psychological covers for specific population or community may be necessary in some sanctuaries and parks. Need for such action is defined by comparative values of related measurements. Any such action should complement the synecological balance in the ecosystem and is always sized to reasonable cost-benefit features.

12.4. Repeated extensive annual fire may have serious limiting effect. It has to be controlled. One way to control the hazard is the controlled fire itself which in some ranges can be used as a tool to promote better resource matrix. Generally all fire protection measures applied in forestry are equally good for wildlife too.

13. Diseases:

In a properly maintained wildlife sanctuary or park any inherent disease remains controlled by the natural resistance of the healthy populations. Effective application of prophylactics and preventives is practicable in our sanctuaries and parks. It is being put to convincing practice by the Forest Veterinarian, Dr. Krishnamurty, in Mudumalai.

0.0. Obligation of the forester:

The forester holds charge of more than one-fifth of the total land area in this country. He has to identify the natural areas of irreplaceable elements in landscape and biota. He has to integrate and cushion those in larger complexes of natural areas. He has to learn to make the wisest use of the total complex. But, he should never forget the main theme of the trust he holds in the wildlife sanctuaries and parks. He should not mutilate the natural landscape by unnatural structures and match' box multistoried buildings as have been made in some and planned for others.

The Smooth Coated Indian Otter, *Lutra perspicillata* Geoffroy (Carnivora: Mustelidae)

During our recent visit to the Corbett National Park, U.P. we had an opportunity to observe a group of Smooth Coated Indian Otter, *Lutra perspicillata* catching and feeding on a large Mahaseer. A group of four Otters, two of which looked older, were observed diving and emerging repeatedly on the other side of the river, in their characteristic playful manner. A few minutes later they pushed out a large Mahaseer on the sandy bank and started feeding on it. During the feeding there was a minor scuffle amongst them and a high pitched shrieking sound was heard at short intervals. The otters are known to immobilise their fish prey by cutting off their fins. This was confirmed by an examination of the prey after it had been abandoned by the otters.

Specimens of smooth coated Indian Otters were earlier seen by one of us (R.N.B.) in Munsar tank, Viramgam, Gujarat, from where they have not been recorded, so far. The approximate distributional range of this species is Sumatra, Malaya States, Indochina, possibly Western Yunnan, Burma, Assam, Nepal Terai, Sind and Southwards to Travancore in India (Ellerman and Morrison-Scott 1951).

13, Subhas Road,
Dehra Dun.

R.N. Bhargava
Mahabir Prasad

Reference

Ellerman, J.R. & Morrison-Scott, T.C.S. (1951). Check-list of palaearctic and Indian Mammals, Brit. Mus. Nat. Hist. London.

Geographical and Altitudinal Distribution of Amphibians and Reptiles in the Himalayas

(PART III)

By

ROBERT C. WALTNER

- *129. **Elaphe hodgsoni** Gunther
The Himalayas, from Sikkim and Darjeeling to Ladak and Kashmir (Srinagar), and Assam (Garo Hills). 3,000-6,000 feet.
(20, 21, 22)
130. **Elaphe cantoris** Boulenger
The E. Himalayas (Sikkim and Darjeeling Dist.), and Upper Burma (Pangnamdim, north of the Triangle). Common above 5,000 feet in Darjeeling. 3,000-6,000 feet. 29, 21, 22, 24)
131. **Elaphe porphyracea** Cantor
E. Himalayas (Sikkim and Darjeeling Dist.), Assam (Abor country, Sadiya, Garo and Khasi Hills), Burma (Nam-Tamai Valley, north to Fort Hertz, Mogok, Toungyi, Chin Hills), Yunnan, W. China, N. Thailand (Doi Sitep and Doi Ang-Ka), the Malay Peninsula, Sumatra, and Szechuan-Sikang. 0-9'000 feet.
(20, 21, 22, 24)
132. **Elaphe mandarina** Cantor
E. Himalayas, N. Burma, Yunnan, S. China, and Szechuan-Sikiang. 6,000-12,000 feet. (12)
133. **Ptyas korros** (Schlegel)
E. Himalayas (Darjeeling), Khasi Hills, N. and Lower Burma, Yunnan, S. China, and Chinese palearctic. 0-9,000 feet. (19, 21, 24)
- *134. **Ptyas mucosus** Linnaeus
The E. Himalayas (Sikkim and Nepal), Kashmir, Chitral in the north-west, the whole of India to Baluchistan, Ceylon, Afghanistan, Turkestan, the whole of Indo-China as far north as the Abor country, the Andaman Is., Yunnan, S. China, and Hainan. Plains to 12,000 feet. (10, 14, 20, 21, 22, 24)
135. **Zaocys nigromarginatus** Blyth
The E. Himalayas (Sikkim, Darjeeling, and Nepal), Assam and Upper Burma (Khasi, Kachin and Naga Hills and Pangnamdim in the Nam Thmai Valley), Tong-King (Chapa), Yunnan and W. China. 3,000-9,000 feet. (20,21,22,24)

136. **Coluber fasciolatus** Shaw
Peninsular India, extending in the north-west as far as a line drawn from Baroda through Gwalior to the Himalayas south of Nepal, in the east to W. Bengal, and Northern Ceylon. Elevation (?). (20, 22)
- **137. **Coluber diadema** Schlegel
W. Himalayas, plains, of India W. Tibet, and Mediterranean palearctic. Plains to 6 feet. (21), 000
- **138. **Coluber ventromaculatus** Gray and Hardwicke
W. Himalayas, plains of India, and Mediterranean palearctic. Plains to 6,000 feet. (21, 22)
139. **Liopeltis stoliczkae** Slater
Sikkim, Darjeeling Dist., Assam (Naga Hills), and Burma (Karin Hills). 0-6,000 feet. (20, 21, 22, 24)
- *140. **Liopeltis rappi** Gunther
E. Himalayas (Sikkim, Darjeeling, and Nepal) and W. Himalayas (Simla). 3,000-9,000 feet. (20, 21, 22, 24)
- **141. **Liopeltis calamaria** Gunther
W. Himalayas, plains of India, and Mediterranean palearctic. Plains to 6,000 feet. (21)
142. **Liopeltis frenatus** Gunther
E. Himalayas, Khasi Hills, and N. and Lower Burma. 0-6,000 feet. (21)
- **143. **Contia persica** Anderson
Murree in the W. Himalayas, N.W.F.P. (Waziristan, Parachinar, and Malakand), Baluchistan, Sind, Iran, and Transcaspia. Plains to 6,000 feet. (20, 21)
144. **Oligodon juglandifer** Wall
Sikkim and Darjeeling Dist. 0-6,000 feet. (20, 21)
145. **Oligodon albocinctus** Cantor
E. Himalayas (Sikkim, Darjeeling, and Nepal), Bengal (Kaligahj, Rangpur Dist.), the whole of Assam, Chittagong Province, Burma as far south as the Arrakan Hills. Plains to 6,000 feet. (20, 21, 22, 24)
146. **Oligodon malaneus** Wall
Sikkim and Darjeeling Dist. 3,000-6,000 feet. (20, 21, 22, 25)
147. **Oligodon erythrogaster** Boulenger
E. Himalayas (Sikkim, Darjeeling Dist., and Nepal), Nagorkote, and Tingharia. 3,000-6,000 feet. (20, 21, 22, 24)

*148. **Oligodon arnensis** Shaw

The W. Himalayas to Nepal and Bengal (Kaliganj, Rangpur Dist.) in the north-east, Baluchistan and the N.W.F.P. (Bannu) in the north-west, Peninsular India to Sind, and Ceylon. Plains to 6,000 feet. (20, 21, 22)

149. **Oligodon cinereus** Gunther

E. Himalayas, Khasi Hills, N. and Lower Burma, and S. China. Plains to 6,000 feet. (21)

150. **Oligodon melazonotus** Wall

E. Himalayas. 0-3,000 feet. (21)

151. **Oligodon cyclurus** Cantor

Darjeeling, Khasi Hills, plains of India, and N. and Lower Burma. Plains to 3,000 feet. (21, 24)

152. **Ahaetulla ahaetulla** Linnaeus

From E. Himalayas and Bengal to S. China. Khasi Hills, N. and Lower Burma, and the whole of the Indo-Chinese region. Plains to 6,000 feet. (20, 21)

153. **Ahaetulla gorei** Wall

E. Himalayas (Sikkim and Darjeeling), Khasi Hills, Assam north to the Abor country, Burma (Toungyi), and Tong-King. 0-6000 feet. (20, 21, 22)

154. **Ahaetulla cyanochloris** Wall

Sikkim, Darjeeling Dist., Assam north to the Thandaung Hills, Upper Burma (Htingnan in the Trinagle), Tenasserim, Thailand in the north-west, and the Andaman and Nicobar Islands. 0-6,000 feet. (20, 21, 22)

155. **Ahaetulla tristis** Daudin

Sikkim and Darjeeling in the north-east, Sind in the north-west, Peninsular India, and Ceylon. Plains to 6,000 feet. (20, 21, 22, 24)

156. **Ahaetulla pictus** Boulenger

Sikkim and Darjeeling. Elevation (?). (22, 24)

157. **Chrysopelea ornata** Shaw

The Darjeeling Dist., to Patna and Buxar in Bihar and Orissa, the whole of the Indo-Chinese region (the Triangle in Upper Burma, Tong-King, south to lat. 6° N.), and S. China (Hong Song). Plains to 6,000 feet. (20, 21, 22)

158. **Lycodon jara** Shaw

The E. Himalayas (Sikkim and Darjeeling) as far west as longitude 85°, Bengal, Khasi Hills, Assam, and Ganjam in the northern part of Madras State. Plains to 6,000 feet. (20, 21, 22, 24)

- **159. *Lycodon mackinnoni* Wall**
W. Himalayas (Almora, Muktesar near Naini Tal, and Mussoorie). 6,000–9,000 feet. (20, 21, 22)
- *160. *Lycodon aulicus* Linnaeus**
E. and W. Himalayas, plains of India, Ceylon, Assam, and N. and Lower Burma—north of lat. 17°. Plains to 6,000 feet. (10, 20, 21, 22, 24)
- 161. *Lycodon fasciatus* Anderson**
E. Himalayas, Khasi Hills, Assam, S.E. Tibet, Burma, Thailand (Tawkawbee), Yunnan, Upper Laos, W. China, and Szechuan-Sikang. 3,000–9,000 feet. (20, 21, 22)
- **162. *Lycodon striatus* Shaw**
W. Himalayas, plains of India, and Mediterranean palearctic. Plains to 6,000 feet. (21)
- 163. *Dinodon septentrionalis* Gunther**
E. Himalayas (Sikkim, and Darjeeling), Assam, Burma, Thailand as far south as Chiengamai, Upper Laos (Chieng-Kuang), and Tong-King (Chapa, Ngaj-Son). 3,000–6,000 feet. (20, 21, 22, 24)
- 164. *Dinodon gammiei* Blanford**
Sikkim and Darjeeling Dist. 3,000–9,000 feet. (20, 21, 22)
- *165. *Sibynophis collaris* Gray**
Sikkim, Darjeeling, Nepal, as far west as Simla, Assam north to the Mishmi Hills, W. Yunnan, Laos, the whole of Burma and the hilly country of Thailand, Annam Koh Chang, in the Bibht of Bangkok, Gunong Taken, Pahang, and in the Malay Peninsula. 3,000–12,000 feet. (20, 21, 22, 24)
- **166. *Sibynophis sagittarius* Cantor**
W. Nepal, the W. Himalayas, and northeastern India from U.P. and M.P. to E. Bengal. Plains to 3,000 feet. (20, 21, 22)
- 167. *Natrix parallela* Boulenger**
Sikkim, Assam, Upper Burma, as far south as lat. 22°, Yunnan, and Tong-King (Fan-Si-Pan Mts.). 3,000–9,000 feet. (7, 21, 22, 24)
- 168. *Natrix himalayana* Gunther**
The E. Himalayas as far west as Sikkim, Darjeeling, and Nepal, Assam, and Upper Burma (north to lat. 27° and as far south as lat. 22°N.). 0–6,000 feet. (20, 21, 22, 24)

*169. **Natrix piscator** Schneider

E. (Sikkim, Darjeeling, and Nepal) and W. Himalayas, northeast and central States, Upper Burma, Yunnan, and Upper Laos. Plains to 9,000 feet. (10, 20, 21, 22, 24)

170. **Natrix khasiensis** Boulenger

E. Himalayas, Khasi Hills, N. Burma, and S. China. 0-6,000 feet. (21)

171. **Natrix subminiata** Schlegel

The whole of the Indo-Chinese subregion as far as Sikkim and Darjeeling in the northwest, southern China, Hainan, Hong Kong, and the Malay Peninsula and Archipelago. 0-9,000 feet. (20, 21, 22, 24)

*172. **Natrix platyceps** Blyth

Himalayas from Assam (Abor and Khasi Hills) in the east to Kashmir in the west. Common in the Darjeeling Dist. between 5,000 and 6,000 feet. 3,000-6,000 feet. (10, 20, 21, 22, 24)

*173. **Natrix stolata** Linnaeus

Sikkim, Darjeeling, Nepal, W. Himalayas, plains of India, Khasi Hills, N. and Lower Burma, S. China. Plains to 6,000 feet. (10, 21, 22, 24)

174. **Pseudogenodon macrops** Blyth

The E. Himalayas as far west as Nepal, Assam, the whole of Burma as far north as lat. 28° and south to Tenasserim (Taok plateau), Thailand (Pa Meang in the extreme north), Annam (Langbian plateau), and the Malay Peninsula (Cameron Highlands). 3,000-9,000 feet. (7, 20, 21, 22, 24)

*175. **Trachischium fuscum** Blyth

The Himalayas from Sikkim, Darjeeling Dist., and Assam in the east, to Gilgit, Loharganj, and Garwhal Dists. in the west. Between 5,000 and 7,000 feet at Darjeeling. 3,000-9,000 feet. (20, 21, 22, 24)

176. **Trachischium guentheri** Boulenger

Sikkim, Darjeeling Dist., and Nepal. 3,000-9,000 feet. (20, 21, 22, 24)

177. **Trachischium tenuiceps** Blyth

Sikkim, Darjeeling Dist., Nepal, and hills near Barakar. 0-6,000 feet. (20, 21, 22, 24)

*178. **Trachischium laeve** Peracca

W. Himalayas (Muktesar and near Naini Tal). 6,000-9,000 feet. (20, 21, 22)

179. **Trachischium monticola** Cantor

E. Himalayas and Khasi Hills. 0-3,000 feet. (21)

180. *Boiga ochracea* Gunther

E. Himalayas (Sikkim, Darjeeling Dist., and Buxar Duars), Khasi Hills, and Assam (Goalpara, Sibsagar, and Cachar). 0-6,000 feet. (20, 21, 22)

***181. *Boiga trigonata* Schneider**

E. Himalayas (Sikkim and N. Bengal), W. Himalayas (Sabathu and Almora), the N.W.F.P. and Transcaspia, extending in the northwest to Baluchistan, the whole of the Peninsula of India, and Ceylon. Plains to 3,000 feet. (20, 21, 22, 24)

[82. *Boiga gokool* Gray

The E. Himalayas as far west as Darjeeling, Assam as far south as lat- 24°N., and Chittagong. Plains to 3,000 feet. (20, 21, 22)

(To be continued)

PHEASANT FARM

In 1972, a privately owned concern was registered with the Government of Nepal. The concern started a Pheasant and Wild Fowl Farm in the Pokhara Valley.

During 1973-74, the farm has hatched and reared more than 2000 'Ringneck' pheasants and also various species of partridge, quail and wild fowl. The rearing of the 'Ring-neck' is a commercial and not a conservation proposition. Nepal Kalij has also been successfully bred. A re-establishment project may be started next year. The firm hopes to breed the more difficult high altitude species—the Tragopan, Blood Pheasant and Koklass.

For information on pheasant breeding contact:—

- | | | |
|--|---|---|
| 1. K.L. Mehta, Chief Wild Life Warden
Himachal Pradesh,
SIMLA (H.P.) | 2. James Roberts,
Mountain Travel
Maharajganj
KATHMANDU
(Nepal) | 3. Philips Wayre,
Director
The Pheasant Trust
Great Witchingham
NORFOLK (England) |
|--|---|---|

Stray Thoughts on the Pursuit of Game

By

R. RADCLIFFE

Shikar or the hunting of game, fish, fowl or beast, is now a dirty word—like dividends or capital—and those who take pleasure in it are to be pursued by a growing pack of 'Antis' who show somewhat the same enthusiasm as was shown by early American Lynchers.

Little do the 'Lynchers' pause to reflect that their form of pursuit is also a kind of shikar—albeit in a most undesirable form! But an age-old one—the pursuit of the quarry—in their case those whom they consider the enemy of their society. Somewhere deep down in mankind is this impulse for aggression. For those interested in this aspect of our make-up, a book to read is 'Konrad Lorenz : 'On Aggression'.

The pursuit of the game is as old as time. Quite apart from the necessity to obtain food in the form of game, there was also present the very fun of it; an expression of manliness, an adventure. There was in addition the need to protect the community from the depredations of carnivorae and herbivorae which destroyed cattle and food crops. These factors and needs still remain today and those who shut their eyes to them are unwise, for if they wish to stop all hunting or as they protest, preserve wild life, or the wiser amongst these who wish only to control hunting in a more acceptable form, then full recognition must be given to these factors if there is to be any chance of success in achieving their objectives.

Wide publicity is given by the 'Wild-Lifers' to the "Save the Tiger" Scheme. Admirable in some respects, but many of those who control this scheme or support it with funds, live in comfortable houses in big cities often in Europe, where long ago the inhabitants got rid of dangerous or destructive animals! Curiously they now ask the Indian villager to live side by side with tiger and panther and do nothing about it! It has always been attractive to do good at somebody else's expense and gain the credit! This is not to decry the scheme or not to appreciate its reasoning.

Perhaps a little deeper thinking on the results of the total ban on the shooting of tiger in many States for the past several years would not be unprofitable.

The shikari hunted the tiger but in so doing he gave employment to the rural community in many and varied ways!

He gave a measure of protection to villages and he added a new dimension of excitement and adventure to an often hum-drum of life led not only by himself but by the villagers too who participated in the sport. The fact that the shooting of tiger has been prohibited has not for one moment prevented the villager from protecting himself and his cattle. He has other means to use than the Shikari—Folidol. This has resulted in the

near extermination of the tiger and panther. The point is, the villager must and will protect himself and he will continue to do so.

The elephant, a great raider of fields, deer of various species, wild pig, all classified in the same way by the village cultivator—an unnecessary nuisance and will tend to go the same way as the tiger has gone.

I have often been amused by the attitude of the city dweller or the person living in a highly developed European country when asked what he would do if an elephant or tiger was running loose in Guindy Park in Madras or Hyde Park in London. The answer always is, call in the police and have the animal shot. Not in my garden or park but by all means in the villagers' gardens !

Until there is a reasonable and pragmatic approach to game control and shikar, the wholly desirable aim of preservation of the wild life of the world will surely fail.

The matter is worth serious consideration in India for recently the Central Wild Life (Preservation) Act has been enacted and this is being adopted by all the States as a model for a new set of Game Rules, with varying degrees of enthusiasm, possibly each trying to outdo the other State in restrictive rules; rather like some of the wilder forms that Land Reform legislation took in its earlier stages.

Let us have a sensible, practical, workable legislation that will be in line with the present-day thought and local needs so that the desirable objective of preservation of wild life may be attained.

Now for the fun and excitement of shikar, I am quite uncontrite over this aspect.

Shooting many years ago in some scrub jungle with the aim of bagging wild pig, we had finished the day and our motley collection of beaters and dogs were all sitting and resting by the edge of a small stream discussing why we had not found our pig or where things had gone wrong. Suddenly one of the dogs started screaming and crying out in great fear. An immediate dash was made up the bank to a spot about thirty yards away where the commotion was taking place and the first arrivals shouted a panther had the dog which was almost immediately found out to be a snake and not a panther. When I arrived on the spot, I saw a large python coiled round the dog. The dog by then had stopped its screaming and was vainly trying to bite the coil nearest to its head but was unable to manage it. There was little time to go before the dog would be crushed and dead. By luck and some considerable manoeuvring accompanied by cries from some beaters that I would only shoot the dog, I was able to get a shot with my rifle at a coil on the top of the dog's back, missing the dog but blowing a hole through the coil. The python released the dog which shook itself and ran off. Success was mine and freedom was for the dog which now sits by my side as I write this article. The python came towards me and after some more shooting, all was over. A brute of 13 feet !

The beaters said that, they would never go beating in that place again !

In about the same area some ten years ago, but on a river, I was fishing for Mahseer when my young dog, Trigger, a yellow Labrador, showed great interest near the place where my next move down the river was to be. I looked down and found, much to my discomposure, a python confronting the dog. A fishing rod was hardly the weapon to tackle the snake and the only other weapon was a gaff. This was brought into action and possibly a unique event occurred. Certainly unique, so far, for me. A python was gaffed and not a mahseer! An adventure, I doubt experiencing again and certainly not in my intrusions into the salmon-fishing world of Scotland!

I think it is Dunbar-Brander in his book 'The Wild Animals in Central India' says that if you will stand firm to a charging tiger it will pause for a moment to rear up before striking you down. May be! But I do believe if you stand firm when charged the odds are that the charging animal will veer away and think better of the battle.

Consider a cat and a dog. They confront each other with a great deal of noise and mutual imprecations but the cat means business and the dog knows this and will seldom, if ever, attack but should the cat give just a little ground the dog will be on it and in full attack. I have found this once with a tiger. I was charged by a wounded tigress and stood firm—the charge was so sudden out of a nulla that I had little time to think or act otherwise; on came the tigress, all teeth and claws with much noise but at the last moment it sheered off raising a paw at me as if in farewell and I was left none the worse. It does not always happen this way but that is another story for another day.

I have found this so in my other encounters with dangerous game but seldom with an angry boar which will come on regardless, a real V.C. Winner of the animal world. I believe many of the stories one hears of shikaris being charged are really stories of demonstrations and not true charges, but they sound better if told their way! The trouble with this sort of thing is you never know when it is a true attack to be pressed home as far as it will go!

Then there are the times during the last war which bring back happy memories of days with a rifle, not the brave, courageous, death-defying days of charging with a fixed bayonet found in the story books but—fun.

On the way up Italy chasing the Germans, we had a stay of one night on the grounds of one of the palaces of the King of Italy. Pheasant had been seen and with the memories of earlier and less troubled days, I took my orderly's rifle and went off to see what I could find. Up rose an old cock pheasant to fall to a snap shot, neatly drilled by a 303 bullet.

Again, one particularly happy memory of the Lee Enfield and its use as a sporting weapon.

I was in charge of a detachment in far off Persia and on one occasion, motoring round the country-side with troops showing the flag, we stopped at a 'Chaikhana' on the road-side for some tea; refreshed, off we went on the 40 mile-journey back to camp when on

the left of the road I saw a large wild boar galloping over the fields about a hundred yards off. I was sitting in the leading truck and to take my orderly's rifle and stop the truck was a matter of seconds and luck was with me and with some superb shooting, of course ! the boar was laid low and loaded into the 15 cwt. truck and off we all went, rejoicing. It was a Hindu regiment and my company had a real 'burra khana' that night such as it had not had for many a day in those rather troublesome times.

But there was a sequel to all and this is the part that titillates my memory.

The C.O. decided a few days later to pay a visit to see how the detachment was getting on and if all was in order. He was a very short-tempered Irishman. His batman, was a Mohammedan, an ex-member of the regimental band, and band members having been distributed round the Battalion for such jobs when mobilisation took place. Like all good officers, the C.O. was solicitous for the welfare of his men and he asked his batman that night if he had fed well. He received apparently a non-committal reply. Some days later after the C.O. had returned to H.Q. I was sitting deciphering messages coming in over the R.T. when an extra long one was put before me. As I went on deciphering, phrases came through, 'great blunder': 'all cooking pots to be retinned': 'explanation required' and so on. It seems the truth was finally extracted from the C.O.'s batman that he had had no food that night, could not eat, was mortally offended, etc., etc ! A great story was made of it but nothing could take away that happy memory of a successful shot at a galloping boar and the delight of all my fighting men !

Just a few memories of happy days with a rod or a rifle, similar memories such as these, which, I hope will never be denied to others who are fond of shikar, by thoughtless, biased or narrow-minded people, not understanding the subject and what all it means.

Export of India's Wild Life and its Biological Significance

By

R.K. BHANOTAR, R.K. BHATNAGAR AND D.K. THAKUR

Wild life has been exploited by man since times immemorial for food, pleasure and profit but the present commercial exploitation surpasses all limits reducing wild life population to a point from which extinction is the only possibility left. The greed of man knows no bounds and poaching, poisoning and vandalism have endangered many species and they find a place in the Red Book of the IUCN. This paper brings scattered data of such commercially exploited wild life and shows the danger facing our national wild life heritage. The data does not include internal consumption which may be as much if not more. For elucidating the above the following are the export figures for March, 1968 and for the year April, 1967 to March, 1968.

March, 1968			April, 1967 to March, 1968	
Item	Quantity	Value in Rs.	Quantity	Value in Rs.
	1		2	
<i>Lizard skin</i>	2942 Kg.	2,43,098.00	160167 Kg.	19,96,263.00
<i>Snake skin</i>	6942 „	35,55,912.00	211928 „	7,38,81,187.00
<i>Leopard skin</i>	417	1,70,870.00	3571	14,10,760.00
<i>Other Wild animal skin</i>	x	x	249	1,24,325.00
<i>Other skins</i>	49 Kg.	1,80,215.00	8266 Kg.	18,24,273.00
<i>Lizard skin (Tanned)</i>	26225 „	2,31,998.00	67220 „	21,48,989.00
<i>Snake skin (Tanned)</i>	10580 „	36,19,204.00	146485 „	3,37,70,702.00
<i>Other Reptile skin (tanned)</i>	x	x	149 „	19,772.00

(Contd.)

1			2	
Peacock Feathers	270	11,565.00	4080 „	2,15,743.00
Bird Feather	109 „	15,541.00	1555 „	1,45,766.00
Musk	x	x	48472 gms.	7,95,366.00
Musk	266 gms.	2,431.00	358021 „	20,06,185.00
Tiger Skin	x	x	108 nos.	77,643.00
Live Animals				
Domestic Dogs	3	362.00	36	1,257.00.
Birds	183963	3,28,246.00	1796043	34,62,424.00
Elephants	20	73,080.00	48	2,43,980.00
Tigers	x	x	2	82,950.00
Zoo Animals	945	15,148.00	14511	2,15,621.00
Turtles live	x	x	103	699.00
Other Animals (Inculding Insects)	x	952.00	x	2,79,137.00
Total Value Live Animals			78,35,975.00	
March, 1968			April, 1967 to March, 1968	
Item	Value		Value	
Stuffed Birds and Animals	7,543.00		1,50,763.00	
Collections etc. Zoological Specimens	3,60,464.00		25,87,642.00	
Grand Total:			13,14,85,749.00	

Mammals

Before the export ban imposed in 1969 enormous quantities of feline skins were exported mainly of tigers, panthers and striped and spotted cats. Apart from furs tiger fat is utilised as remedy for rheumatism, lucky bones for luck, claws for charms and ornaments, liver is eaten to impart courage and milk of tigress is used for ailments of eyes. Below are given comparative figures for eight years.

Leopard and Tiger skins were exported to France and U.S.A. The following are figures for 1965 to 1973.

Year	Quantity exported (in Kg.)	Value (in Rupees)
1965-66	240	79464.00
1966-67	245	262154.00
1967-68	105	244687.00
1968-69	15	13309.00
1969-70	4	1014.00
1970-71	x	x
1971-72	x	x
1972-73	x	x
Total	609	600628.00

Leopard and Tiger Fur Skin (undressed)

Year These were exported to Italy and Switzerland. The figures for 1965-73 are as follows—

Year	Quantity exported (in numbers)	Value (in Rupees)
1965-66	6889	1974359.00
1966-67	5353	2594411.00
1967-68	3571	1410760.00
1968-69	2364	1859055.00
1969-70	465	411193.00
1970-71	x	x
1971-72	x	x
1972-73	x	x
Total	18642	8249778.00

Antlers

These were exported to Belgium, France, German FR, Hongkong, Italy, Jamaica, Netherland, Paraguay, Saudi Arabia, Singapore, S. Yemen (P. Rep.), U.K., U.S.A., Vietnam Republic.

The produce is being used for making handles of cutlery, umbrella and sticks and for fancy artistic wares.

The export figures for 1965-73 are as follows:—

Year	Quantity exported (in Kg.)	Value (in Rupees)
1965-66	779	5123.00
1966-67	11306	90599.00
1967-68	9942	77487.00
1968-69	92318	730320.00
1969-70	114471	949717.00
1970-71	29456	317684.00
1971-72	13110	187006.00
1972-73	13328	473885.00
Total:	304663	2831821.00

Elephants

These were exported to Arab Republic, Austria, Belgium, Canada, Czechoslovakia, France, German DR and FR, Iran, Italy, Japan, Netherland, S. Yemen (P. Rep.), U.K. and U.S.A.

The figures for 1964-73 are as follows:

Year	Quantity exported (in Numbers)	Value (in Rupees)
1964-65	6	39000.00
1965-66	21	137700.00
1966-67	14	76000.00
1967-68	48	243980.00
1968-69	5	34000.00
1969-70	8	31000.00
1970-71	39	199216.00
1971-72	35	255916.00
1972-73	22	113399.00
Total:	198	1130211.00

Hoofs, claws and similar products

These were exported to Belgium, France, German FRP, Italy, Japan and U.K.

The figures for 1965-73 are as follows:—

Year	Quantity exported (in Kg.)	Value (in Rupees)
1965-66	562373	266051.00
1966-67	843928	625531.00
1967-68	632266	436692.00
1968-69	982860	607397.00
1969-70	884994	585715.00
1970-71	481914	379694.00
1971-72	595505	449109.00
1972-73	1047111	817280.00
Total:	6030951	4167469.00

Skin of other Wild Animals (excluding fur skin)

These were exported to Canada, France, German FRP, Japan and Switzerland.

The figures for 1965-73 are as follows:

Year	Quantity exported (in Kg.)	Value (in Rupees)
1965-66	256	59669.00
1966-67	696	200003.00
1967-68	449	128265.00
1968-69	3497	195420.00
1969-70	840	23835.00
1970-71	11918	87196.00
1971-72	2	3650.00
1972-73	9750	79713.00
Total:	27408	777751.00

Tigers alive

These were exported to Japan.

The figures for 1965-73 are as follows:

Year	Quantity exported (in numbers)	Value (in Rupees)
1965-66	6	13086.00
1966-67	5	13200.00
1967-68	2	82950.00
1968-69	1	1000.00
1969-73	1	7650.0
Total:	15	117886.00

Zoo Animals

These were exported to Denmark, German FRP, Italy, Japan, Netherland, Spain, Sweden, Switzerland, Thailand, U.K., U.S.A., U.S.S.R. and Yugoslavia.

The figures for 1965-73 are as follows:

Year	Quantity exported (in numbers)	Value (in Rupees)
1965-66	41723	174157.00
1966-67	41873	225861.00
1967-68	14511	215621.00
1968-69	27558	196170.00
1969-70	19815	183450.00
1970-71	1644	26177.00
1971-72	5762	140372.00
1972-73	7550	106947.00
Total:	160436	1268755.00

III—Birds Feathers

Their uses are manifold, from fancy decorative goods, sleeping bags, high altitude clothing and pillows. Both ornamental and ordinary feathers are being exported. These feathers are obtained as nuptial plumage, feathers from crest, breast and neck; feathers from body, head and tail; ordinary and coloured feathers; down of young birds and under wing coverts.

The most important affected birds are large, small and little *Egrett* or *Egretta*; the Reef and the Indian Reef Heron; the Pond and Chinese Pond Heron; the Monal; the Silver Pheasant; the Great Indian Bustard; the Houbara; the Bengal Florican; Lesser Florican, the Swans; the Little and Great Crested Grebe; the Kingfishers; the Bee-eaters; the Blue Jay, the Geese and Ducks; the Sarus; the Common and Demoiselle Crane; the White Ibis; the Smaller Adjutant; the Indian Darter and the Common Flamingo.

Under this category, live birds from Jungle, products of semi-domesticated birds (viz. Peacock feathers); plumes and quills and feathers of other birds are also being commercially exploited.

Live Birds

They were exported to Abu Dhabi, Afghanistan, Arabia, Australia, Austria, Belgium, Baharein, Bulgaria, Canada, Ceylon, Congo, China Rep., Czechoslovakia, Denmark, Ethiopia, France, Finland, German DR and FR, Greece, Hongkong, Indonesia, Iran, Italy, Japan, Kenya, Kuwait, Korea Rep., Lebanon, Malaya, Malaysia, Mauritius, Malta, Nepal, Newzealand, Netherlands, New Caledon, Pakistan, Qatar, Saudi Arabia, Singapore, Sweden, Switzerland, Tangiers, Thailand, Tunisia, Uruguay, U.S.A., U.K. U.S.S.R., Venezuella and Zambia.

The birds exported are not classified whether these were prey or game birds etc. These are being sent as miscellaneous birds.

The figures for 1964-73 are as follows:

Year	Quantity exported (in numbers)	Value (in Rupees)
1964-65	1367159	1839264.00
1965-66	1530172	2115272.00
1966-67	1704436	2972139.00
1967-68	1796043	3462424.00
1968-69	1848303	4391882.00
1969-70	2188825	576697.00
1970-71	1914053	5783947.00
1971-72	1962281	6176810.00
1972-73	2352362	7959827.00
Total:	16663634	35278262.00

Peacock feathers (tail and wing)
(trimmed or untrimmed)

These were exported to Belgium, Denmark, France, German FRP, Italy, Hongkong, Japan, Netherland, Sweden, Switzerland, U.K. and U.S.A.

The figures for 1965-73 are as follows:

Year	Quantity exported	Value (in Rupees)
1965-66	4112 Kg.	138488.00
1966-67	6875 „	205123.00
1967-68	4080 „	215743.00
1968-69	67400 Nos.	103555.00
1969-70	1310886 „	211901.00
1970-71	2891459 „	573480.00
1971-72	1198617 „	41888.00
1972-73	3132919 „	984110.00
Total:	15067 Kg. & 8601281 Nos.	2474288.00

Bird feathers

These were exported to Austria, Australia, Belgium, Canada, Czechoslovakia, France, German FRP, Hongkong, Italy, Japan, Netherland, Singapore, Switzerland U.K. and U.S.A.

Year	Quantity exported (in Kg.)	Value (in Rupees)
1965-66	1941	91715.00
1966-67	1137	102144.00
1967-68	1555	145766.00
1968-69	2553	233619.00
1969-70	756	60102.00
1970-71	1888	160003.00
1971-72	1310	117509.00
1972-73	3289	215889.00
Total:	14429	1126747.00

IV—Reptiles

This group is far much exploited and is being exported in huge quantity every year. It includes Crocodile skin bellies upto 12" both terrestrial and water lizard skins from 7" to 11", snakes (including Python) whip Snakes from 4" to 5½" limits.

The skins exported are either tanned or untanned. In recent years, however, crocodile skin is not allowed to be exported for commercial purpose. However, products made out of crocodile skins are regularly taken away by tourists through various sea and air ports.

These skins are in demand for making scarfs, shoes, belts, leather boxes, hand bags, wallets, purses and comb cases.

Reptiles skins are more durable and their wearing quality is considered more suitable than that of other leather. These skins are ornamental and of variety of design and patterns over them and can easily be tanned in various shades of colour.

The killing of reptiles for trade and commercial purpose is enormous.

In 1932 and 1933 India exported about 25,00,000 and 22,55,000 skins respectively. Over 6,00,000 skins were reported exported from Calcutta port alone in 1932. The skins were mostly of *Varanus* sp. and *Uromastix* sp.

The skins of *Varanus monitor* from Bengal area commanded a higher market value than those from other parts of its range.

Crocodile skin

The figures for only one year 1964-65 is available. The reasons for commercial export ban is indicated above. The skins were exported to France and U.K. Figures for earlier years were not collected.

Year	Quantity exported (in Kg.)	Value (in Rupees)
1964-65	—	25948.00

Lizard Skins

No indication is available of the type of the skins exported—whether Common Monitor, Water Monitor, Agra or Yellow Oval grain lizard from 1964-68. In 1968-69 however, the data is available for different type of skins exported.

(To be continued)

Protection of the Indian Environment

By

P.D. STRACEY, IFS (RETD)

The 'African dilemma' was described some time ago as the choice between 'development' and 'conservation' and although the ordinary African may not be aware of it the educated intellectual certainly is. Some three years ago I attended in Addis Ababa, the capital of Ethiopia, a seminar on African development and it was then that I first became dimly aware of such a situation: the urge for development, especially industrial development, was there but along with it there was a very real fear of the consequences of such development. The term 'pollution' was heard repeatedly and with it the expressed fear that industrial development would bring with it almost as great disadvantages as are inherent in the lack of development, in the modern sense. For instance, the Japanese attempts to set up collaboration projects in various parts of the world were seen more as attempts to remove industrial pollution from their own land than as efforts to secure the advantages of raw materials on the spot and cheap labour. Even expressed was a preparedness to do without such adjuncts to a modern agriculture base as DDT, in the interests of a clean environment. My bemused mind recalled that just across the Arabian sea there were plans being laid at that very moment for a DDT factory in India's Bombay.

Jim Hoagland, winner of the Pulitzer prize for his writings on Africa, has expressed his fears that though Africa still had clear skies, unpolluted rivers and large areas of forests the continent was awaiting an ecological disaster through the long-term needs of nature being subordinated to the immediate needs of man. "For purposes noble and selfish, immediate and long term, an area that resembles in some ways a forgotten corner of Eden, is being merchandised into the modern world, as East Africa faces the challenge of developing its resources", he wrote. He was challenged by an Ethiopian writer in the local paper who said that "Africa's present day need of development is not something to be equated with conservation", and that population and pollution were not threats to Africa at present and (rather naively, I thought) were problems created by cunning plotters with vested interests to frighten away Africans from development.

It is a moot question whether the average educated Indian with his obsession with progress is aware of such a dilemma, nay, is even dimly aware of there being such a possibility in his case. The magazine Science World has highlighted the paradox that while world leaders worried about increasing pollution and increasing demands on nature they at the same time called for greater economic growth; most countries, peoples and companies called for greater riches and everybody wanted more of everything—cars, TV sets and so on—but nobody liked to be told to stop wanting such things. Does such a situation typify India? One is almost inclined to believe so. One has only to walk the streets and view

the all—pervading symbols of progress, which by the very nature of their offerings make demands on the beholder, to appreciate this. On all sides one hears the cry for advancement until the true values of life are blurred and finally forgotten. Professor D. Ehrenfeld, Associate Professor of Biology at Columbia University, in a newly published book 'Conserving Life of Earth' blames the rise of western Christianity and its wrong conception of progress for the ecological disaster in which man finds himself. Is, then, India so influenced by Judeo—Christian values as not to realise that she is also faced with the type of dilemma indicated? Or are her roots so swallow that she can be swept along so easily on the current tide of 'progress at all costs', shutting her eyes to the possibility that it exists? Whatever the answers, it is the heavy task of those who know and feel to do something about it. Absence from the scene for several years is a handicap that cannot be readily overcome; only an attempt will, therefore, be made to analyse the situation and to at the same time present the broader possibilities of a balanced philosophy and a viable programme for Indian man in relation to his environment.

Unlike in Africa, where nature—and in particular wild life—has virtually become an international question (for the western conservationist is convinced that the African countries held their wild life in trust for all mankind) the Indian question has, since independence, developed along national, and for that matter provincial, lines. African wild life authorities did not close their windows to western thinking and assistance in wild life conservation and management; it is only recently that India has begun to reap the benefits of these. India's constitution has, moreover, militated to a certain extent against a national outlook on nature conservation, since the land and all that goes with it are State subjects. It has taken India the whole of the intervening period since independence to come round to the views originally mooted in the founding meeting of the Indian Board of Wild Life, held in Mysore in 1952, that these matters should be placed on the Concurrent List, that the country needed fresh legislation on wild life, and that an independent machinery for its protection was necessary—all of which are embodied in the recent (1972) wild life protection act. While this renaissance, though much delayed, in wild life thinking at the highest circles has been very welcome it is still too restricted in its scope, even allowing for the creation of an office for environmental planning and coordination at the Centre. A machinery for involving the public in the building up of a national outlook on the environment has still to be devised, but this should not be left entirely to the States.

The mass media, particularly the press, has been gradually increasing its coverage of things nature and wild life; since those pioneer days after independence, when only one or two English medium newspapers, notably the Statesman, would accept articles on conservation let alone pay for them adequately, there can be discerned a veritable flood of matter on the subject, much of it admittedly repetitive and most of it marred by poor illustrations and reproductions—something that cannot be helped, however, with our present poor quality printing papers. There has also been a welcome proliferation of societies working

for the protection of nature, though here again their numbers and membership are still distressingly small. All of which brings one to serious consideration of ways and means of enlarging the horizon of environment protection in the country.

As in the case of other laudable movements, one automatically turns to the two major influences in the nation's life spectrum— religion and education. What part can these play in the battle of nature? Looking to the record of religions in the movement for population planning, not only in India, one is not too hopeful as to their potentiation in the almost related field of nature protection. Education—and in particular youth education—offers more promise, however. Nature education should cover everything, from the entertainment-cum-instruction of the young to the inclusion of wild life ecology in university syllabii and specialised research by indigenous wild life ecologists. The field in these respects has, unfortunately, been almost blank but a start can surely be made. It was left to the chief bureaucrat of south Indian State to point out to the writer not very long ago that not all foresters (the main custodians of wildlife in the country) loved animals—thereby implying that this made them basically the poorer protectors of wild life—and that he looked to the creation of wild life clubs in the State to bring out potential talent and interest in nature among the youth of the country, which could lead to the emergence of specifically qualified workers to take over the task of managing and protecting this natural wealth. In a flash I was taken back to Africa, where Kenya and Tanzania are leading the field with a network of youth wild life clubs which, through guided instruction and visits to the parks to see conservation at work, are building up a future corpus of informed public opinion and to my own experience in talking to school children in Ethiopia and my satisfaction in witnessing their keen delight at being shown samples of their own animals and birds on the screen. It is reckoned that not more than thirty per cent of African children have seen a lion or an elephant and if this is the case in a continent which, comparatively speaking, is teeming with wild life what must be the case in India? With satellite education and instruction around the corner this seems an opportune time to lay the foundations for such a nature conservation programme, besides which the present annual wild life weeks and the like will pale into insignificance.

Basically it is a question of priorities. But the importance of public education in the political planning of a country, which has to take into account the effects of economic growth on the environment, cannot be underestimated. The Federal Republic of Germany's efforts to make her people more environment-conscious have taken the shape of an Association for Environment Issues, which will sponsor periodical public conferences where members of parliament and government can be questioned in public debate. They also have the intention to treat environmental protection as an interdisciplinary subject at universities and institutions of higher learning, to use TV to drive home the message, and to publish Environment Reports and an Environment Primer, besides sponsoring environment competitions, such as a competition for the designing of an environment token, etc. Is it too much to expect similar action in India?

A Check-List of Molluscs of Himachal Pradesh, India

By

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INTRODUCTION

The molluscan fauna of Himachal Pradesh has until recently been very little known. In the Fauna of British India series mention has been made about few species only occurring in Himachal Pradesh. Recently, a few species of molluscs have been recorded by Agrawal (in press) found in Himachal Pradesh. The present paper aims at giving a check-list of the species of molluscs available in Himachal Pradesh. Altogether thirty two genera and sixty one species are dealt with.

Himachal Pradesh is a meeting place of Palaearctic and Oriental regions. The area is one of the five regions of the Western Himalayas of the Pauranic concept. It generally coincides with the old Jullundur Khud. The state can be divided into three parts viz. (i) Outer Himalayan region, (ii) Inner Himalayan region and (iii) Alpine Pastures. The whole area abounds in Valleys and each group of villages is bounded by hills and streams.

Topographically, Himachal, the middle Himalayas, is one of the zones of the Himalayas which ranges down the giants of Himadri to the height of 3000 metres.

Due to huge variation in Altitude, Himachal can grow all types of forests right from hard woods to soft long-fibres conifers. Himachal has an area of 55,658 square kilometres.

CHECK-LIST OF MOLLUSCS OF HIMACHAL PRADESH

Class GASTROPODA

Order STYLOMMATOPHORA

Family ARIOPHANTIDAE

Sub-family Macrochlamydinæ

Genus *Macrochlamys* (Benson, 1832) Gray, 1847

Macrochlamys vesicula Benson

1838. *Macrochlamys vesicula* Benson, *J. Asiat. Soc. Bengal*, vii: 216.

Distribution in Himachal Pradesh: Near Simla.

Macrochlamys glauca Benson

1846. *Macrochlamys glauca* Benson, *Pfr. Symb.*, iii: 65.

Distribution in Himachal Pradesh: Kotgarh near Simla.

Macrochlamys nuda Pfeiffer

1852. *Macrochlamys nuda* Pfeiffer, *Proc. Zool. Soc. London*, p. 83.

Distribution in Himachal Pradesh: Simla.

Macrochlamys kuluensis Blanford

1904. *Macrochlamys kuluensis* Blanford (Nevill, MS), *Proc. Zool. Soc. London*, ii: 442, pl. 25, fig. 5.

Distribution in Himachal Pradesh: Kulu.

Macrochlamys ? planiuscula Hutton

1838. *Macrochlamys ? planiuscula* Hutton (Helix), *J. Asiat. Soc. Bengal*, vii: 218.

Distribution in Himachal Pradesh: Simla.

Genus *Euaustenia* Cockerell, 1891*Euaustenia cassida* Hutton

1938. *Euaustenia cassida* Hutton, *J. Asiat. Soc. Bengal*, vii: 214.

Distribution in Himachal Pradesh: Simla.

Euaustenia theobaldi Godwin-Austen

1888. *Euaustenia theobaldi* Godwin-Austen, *Mol. Ind.*, i: 236, pl. 52, fig. 5.

Distribution in Himachal Pradesh: Dharamshala in Kangra Valley.

Euaustenia (Syama) splendens Hutton

1838. *Euaustenia (Syama) splendens* Hutton, *J. Asiat. Soc. Bengal*, vii (i): 215.

Distribution in Himachal Pradesh: Simla.

Euaustenia (Syama) prona Nevill

1878. *Euaustenia (Syama) prona* Nevill, *Yark. Miss., Mol.*, p. 17.

Distribution in Himachal Pradesh: Simla.

Genus *Khasiella* Godwin-Austen, 1899*Khasiella hyba* Benson,

1861. *Khasiella hyba* Benson, *Ann. & Mag. Nat. Hist.* (3) vii: 83.

Distribution in Himachal Pradesh: Between Dalhousie and Chamba.

Khasiella ? chloroplax Benson

1865. *Khasiella ? chloroplax* Benson (*Helix*), *Ann. & Mag. Nat. Hist.*, (3) xv: 14.

Distribution in Himachal Pradesh: Near Simla.

Genus *Bensonia* Pfeiffer, 1855*Bensonia angelica* Pfeiffer

1856. *Bensonia angelica* Pfeiffer (*Helix*), *Proc. Zool. Soc. London*, p. 33.

Distribution in Himachal Pradesh: Chamba State.

Bensonia theobaldiana Godwin-Austen

1888. *Bensonia theobaldiana* Godwin-Austen (Nevill, MS), *Mol. Ind.*, i: 251.

Distribution in Himachal Pradesh: Narkanda, E.N.E. of Simla; Kulu.

Bensonia convexa Reeve

1852. *Bensonia convexa* Reeve (*Helix*), *Conch. Ic.*, pl. 127, fig. 762.

Distribution in Himachal Pradesh: Simla.

Genus *Girasia* Gray, 1855*Girasia dalhousiae* Godwin-Austen

1888. *Girasia dalhousiae* Godwin-Austen, *Mol. Ind.*, i: 224, pl. 61, figs. 1, 1a (animal), pl. 62, figs. 4, 4a (jaw and teeth).

Distribution in Himachal Pradesh: Dalhousiae, Chamba Hills.

Genus *Kaliella* Blanford, 1863*Kaliella fastigiata* Hutton

1838. *Kaliella fastigiata* Hutton (*Helix*), *J. Asiat. Soc. Bengal*, vii: 217.

Distribution in Himachal Pradesh: Simla.

Kaliella ? nana Hutton

1838. *Kaliella ? nana* Hutton (*Helix*), *J. Asiat. Soc. Bengal* vii: 218.

Distribution in Himachal Pradesh: Simla and Kulu.

Kaliella ? bullula Hutton

1838. *Kaliella ? bullula* Hutton (*Helix*), *J. Asiat. Soc. Bengal*, vii: 218.

Distribution in Himachal Pradesh: Simla, Kulu.

Kaliella bhasani Rajgopalaienger

1953. *Kaliella bhasani* Rajgopalaienger, *Rec. Indian Mus.*, LI (1): 19-22.

Distribution in Himachal Pradesh: Simla Hills.

Family ENDODONTIDAE

Genus *Sphyradium* Charpentier, 1837*Sphyradium himalayanum* (Benson)1863. *Pupa himalayanum* (Hutton) Benson, *Ann. & Mag. Nat. Hist. Ser.*, 3, xii: 428.1914. *Sphyradium himalayanum* Gude, *Fauna Brit. India, Mollusca*, II: 41.*Distribution in Himachal Pradesh:* Simla.Genus *Pyramidula* Fitzinger, 1833*Pyramidula humilis* (Benson)1838. *Helix humilis* (Hutton) Benson, *J. Asiat. Soc. Bengal*, vii: 217.1914. *Pyramidula humilis* Gude, *Fauna Brit. India, Mollusca*, II: 43.*Distribution in Himachal Pradesh:* Simla.

(To be continued)

Trend notes on extinct species of mammals

IUCN recently published an Occasional Paper No. 8 a list of mammals which have become extinct or are believed to be extinct since 1600. Compiled from many sources by H.A. and J.M. Goodwin, the list contains 112 mammals whose disappearance can be dated, and 5 animals thought to be extinct but about which some doubt exists.

An analysis of the 112 dates of disappearance, set out as a table, clearly shows the rise of man's impact on the natural world:

Extinction of Mammal Taxa

17th Century	7
18th Century	11
19th Century	27
20th Century	67

However, the rise of man's concern for nature is also shown by a breakdown of the 20th Century losses, by 20-year periods:

1900-1919	23
1920-1939	27
1940-1959	14
1960-	3

 67

Spatial-Specific Conditioning in the Spotted Deer

Axis Axis Axis (Erxleben)

The small, beautiful plateau of Topslip is situated at an elevation of *ca* 830 m on Mount Stuart in the Anamalai Ranges of the Western Ghats. From Pollachi in Tamilnadu State, it is about 40 km to the south west, on way to Parambikulam in Kerala State, and actually lies on the border between the states. While on an ecological and faunistic survey trip to Anamalais, I had the occasion to observe for a week, a herd of spotted deer that used to come regularly to the grassy slope in front of the forest rest house. They made their appearance here in small sub groups at about 5.30 to 6.30 every evening, time varying according to light conditions. During my observations, an aspect of observer-reaction shown by these deer struck me as interesting and one that is not previously commented upon in its true sense.

The observer-reaction of the herd was watched in two ways. First, the herd was approached against the wind, through the fringe forest, the observer suddenly emerging into the open and revealing himself at a fairly close range. The herd, after initial immediate bolting, however, paused and stood closely scrutinizing the observer and retreated again only on further advance by him. In the second method, the observer revealed and allowed himself to be spotted from a long distance, which was obviously much too long for them to sense any immediate threat, as the herd continued to graze nonchalantly. As he advanced more, the whole herd stopped grazing and stood watching, but still held their ground. The observer then retraced a few steps back to see the reaction, and surprisingly a few deer actually came trotting forward to peer more closely at him, as it were, and retreated only on further advance by the observer. This was repeated on several occasions, the confrontation lasting till the observer departed, or actively drove the herd into the forest, as the case may be. I had never observed such object-scrutinizing-curiosity in spotted deer, though this reaction is known to occur in the case of Blackbuck, *Antelope cervicapra*. The deer invariably returned in a short while, or as soon as they felt that the coast was clear.

My first interpretation of this intruder-daring was that it is a characteristic of partial exposure to harmless noninterfering human habitation near this place. But in fact that it was not so, and that this was a case of spatial-specific (locality-fixed) conditioning related to a particular locality only and dictated by feeding instinct was soon revealed by further observations on the same herd at adjacent, but different type of habitat. The latter locality, a secluded spot on an ill used forest path with some meagre grass growth around,

was hardly a quarter Kilometre away from the first place. A sub group of the very same herd with two does and two fawns, took to their heels, everytime the observer was seen or sensed, even at a distance which failed to alarm them in the first locality. And they did not return to the place even after hours. On all occasions, a change in the direction of the wind or a slight crackling under the foot was enough to make them silently vanish into the jungle. Obviously there was none of that daring, reluctance to leave, and surprising curiosity so markedly shown by them in the adjoining locality.

This means that when it is said that a wild animal or a population of it, is accustomed to people and to that extent is less wild, the conditioning is not in regard to people who are incidental for the animal, but with regard to the locality or the exigency under which the feeding instinct is served. I have observed similar differential behaviour varying according to locale in other animals, especially Nilgiri langurs near the same locality and also elsewhere in Anamalais and Cardamom Hills.

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Bottle Feeding Natures Orphans

Mr. M.M. ISLAM, I.F.S.

Conservator of Forests, Assam, Gauhati-3.

Without any fan fare of publicity the wildlife protection guards often carry out relief operations bringing succour to the wildlife inside wildlife parks and sanctuaries during floods at considerable risk when marooned animals have to be rescued and others found a refuge in safe areas. Their activities do not confine to protection work alone. They have to attend to sick animals and bring up young ones separated from their mothers, often with feeding bottles. The wildlife guards also take precaution that their wards are happy in their natural habitats with sufficient food and cover and least disturbance so that they can increase in numbers and offer healthy offspring.

Tiger Babies: One pair of baby tigers about 15 to 20 days old were received and reared carefully in the Assam State Zoo, Gauhati. On 7-9-73 after a long journey of about 500 k.m. in a passenger carrier they arrived at their new home. How they got separated from their mother is another story. The male weighed 1,900 grams and the female, which looked bigger 2,150 grams. They were centre of attraction inside the Zoo and under the affectionate care of their keepers they felt happy and began to settle down in a new world.

The tiger cubs were bottle-fed like any human child. They were given cow's milk, boiled and then allowed to cool, and mixed with protinex. Two hundred fifty ml. of milk was given five times a day to one cub. After ten days the quantity of milk was doubled and gradually they were introduced to minced mutton (50 grams to begin with and gradually increased to one Kg. in 30 days). The Canine teeth fully developed in about 100 days, when they were given one Kg. of mutton (instead of minced meat) in addition to milk.

They were fond of milk (but not without protinex). They avoided water for a considerable time. Their growth was remarkable and when they were about 6 months old (January, 1974) they were shifted to bigger enclosures. From April, 1974 milk supplied was one litre a day with two and a half Kg. of mutton and one Kg. of beef. In June, 1974 they were given only half a litre of milk and 2 Kg. of beef in addition to 2 Kg. of mutton. From July, 1974 milk was stopped. They had no ailments so far except the female baby suffered from gastro-enteritis for 5 or 6 days. Though they are now quite healthy and big enough to be termed baby, they are fond of their keeper and always look to him as their guardian. From October, 1974 (when they are 14 months old) 5 Kg. of beef is given to each daily.

Rhino Babies: During the monsoon rains of 1973 and 1974 the rhino lands on either bank of the Brahmaputra river suffered from floods and estimates vary on the casualties

to wildlife. During 1973 three rhino babies, less than two months old were found swept down by the swift currents of the Brahmaputra river. They were rescued with considerable difficulty and were shifted to the State Zoo at Gauhati. They got new lease of life. The first baby rescued on 21.6.73 was about 15 days old, height 0'65 M. length 1'15 M. and 1'1 M girth. She was fed with the help of feeding bottles seven litres of cow's milk daily (boiled and then cooled). Cycle rubber tubes fitted at the mouth of long bottles were used as feeding bottles. They were encouraged to lick the milk from a saucer after 15 to 30 days. After a few days 200 grams of barley water mixed with 100 grms of sugar and 50 grams of glucose were added. Ten drops of abdec and two spoons of gripe water three times a day were given. Two more babies (both female) were received on 11.8.73 and 14.8.73. They were also treated similarly and found to be happy in the new surroundings. Gradually they were introduced to other kinds of food like athia banana (*Musa baradisiota*) (mashed and seeds removed, and mixed with milk and rice), gram, mati kalai (*Phaseolus mungo*) soaked in water for 24 hours and rice or wheat bran. Milk supply was also gradually reduced and stopped when they are one year old. Common salt to taste was added to mati kalai, bhusi and gram. Rock salt was placed inside the enclosure for licking when they felt like it. During 1974 three rhino babies were received in the Zoo and were treated similarly as given below.

Nature of food	Age of the baby Rhino				
	15 days	3 months	4 months	6 months	9 to 12 mths
Milk	7 litre	4 litre	2 litre	2 lstre	1 litre
Barley	200 grams				
Glucose	50 grams				
Gripe-water	2 spoons tds				
Abdec drop	10 drops tds				
Sugar	100 grams	100 grams	100 grams		
Rice (coocked)		$\frac{1}{2}$ Kg.	$\frac{1}{2}$ Kg.		
Athia-banana		10 Nos.	10 Nos.	10 Nos.	10 Nos.
Green grass		$\frac{1}{2}$ bag	1 bag	2 bags	2 bags
Gram				1 Kg.	1 Kg.
Mati Kalai				1 Kg.	1 Kg.
Bhusi				400 gram	
Wheat Bran					$\frac{1}{2}$ Kg.

Form and Function of Horns, Antlers and Tusks

By

T. ANTONY DAVIS

Indian Statistical Institute, Calcutta

(Continued)

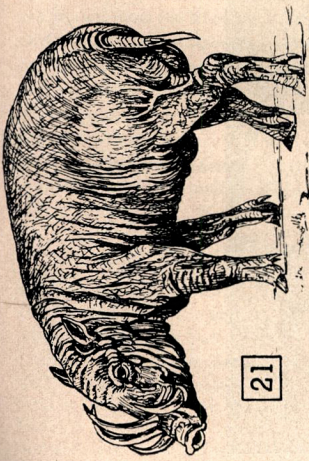
Tusks

Tusks differ from horns and antlers in their origin, morphology, structure and the material with which they are made. However, like horns, tusks are used as weapons to attack other animals. Tusks are the specially developed teeth and so they originate from the jaw, while horns and antlers are outgrowths from the top of the cranium. The nasal horns of the rhinoceros and the upwardly curving tusks that pierce through the snout of the Celebes pigs (Fig. 21) may appear—misleadingly, to have similar origin. Tusks may be the enlarged incisors as in elephant (Fig. 22), or the canines as in walrus (Fig. 23). Unlike antlers, tusks are unbranched and permanent. Regeneration is not possible when a tusk is destroyed. Like horns, tusks in an individual animal are bilaterally symmetric. The attractive qualities of the ivory with which tusks are made make tusks very valuable to man which surpasses the importance of even horns and antlers. Tusks in elephants and pigs as well as two sea mammals (walrus and narwhal) are briefly described below.

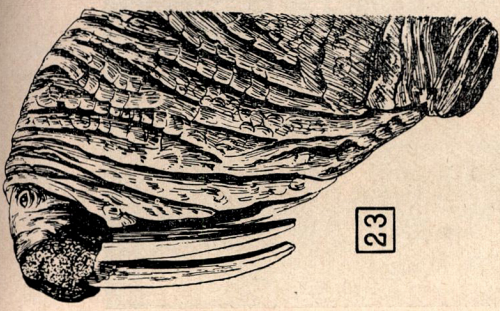
Tusks of Elephants

Among tusk-bearing animals, elephants are by far the most important ones. The term 'tusk' ordinarily refers to a male elephant bearing prominent tusks. The upper incisors in elephants develop into the ivory tusks which are the longest and heaviest teeth of any living animal. Canine teeth are absent for elephants. There is normally only one functional tooth at a time on each side of the jaw. These teeth are replaced from the rear as they wear away. Many prehistoric proboscideans were also known to possess tusks. The Pleistocene woolly mammoth (Fig. 24) bore gigantic and arching or spiralling tusks. The straight-tusked mammoth (*Loxodonta*) is nearest to the living African elephant (Carrington 1958).

There are only two species of elephants living today, the Asiatic species (*Elephas maximus*) and the African elephant (*Loxodonta africana*). Both the males and females of the African species bear massive tusks which average about six feet long, and the pair weighs 80 lbs. to 120 lbs. A pair of tusks displayed at the British Museum weighs 293 lbs. The larger one is 11 ft. 5 in. long with a basal circumference of 18 inches. As the Asiatic elephant is smaller in size compared to the African species, the tusk of the former is also smaller, average about 5 ft. long, and the pair may weigh about 70 lbs. However, large tusks, 9 ft. long weighing 150 lbs. have been recorded. There are four races of the Asiatic



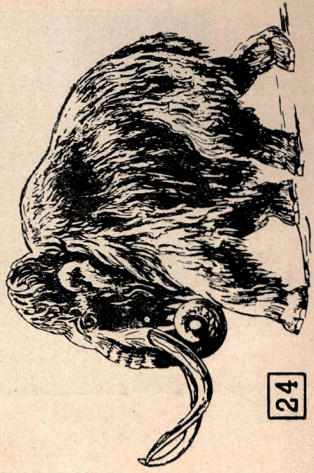
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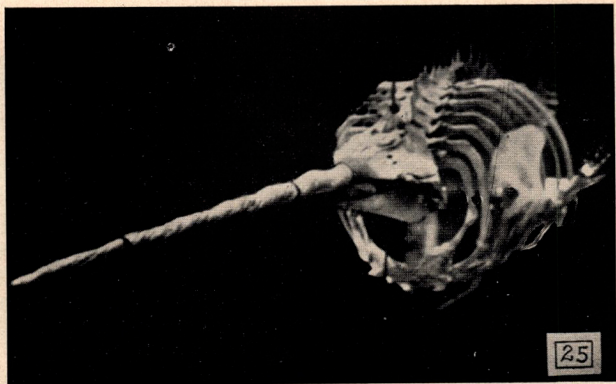
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22



24



A Reindeer

elephant. The female of the Indian race does not bear any tusk. Moreover, both the male and female of the race in Sri Lanka do not grow any tusk.

Importance of Ivory

The most important of all commodities obtained from the elephant carcass is the ivory. Even in prehistoric times the mastodon and the mammoth were hunted both for food as well as for their tusks. Early men used ivory for making fish hooks, arrow straighteners and similar other implements. Ivory is in great demand for making ornaments and furniture. Beds, thrones and even houses and palaces were made of ivory. It was recognised at a very early stage that the tusk of the African elephant was more suitable for ivory-carving than that of the Asiatic elephant. Hence the African elephants were slaughtered more than the Asiatic species. Between the tusks of bull and cow elephants, that of cow is generally regarded as superior as its grains are closer which takes polish better.

Tusk of Walrus

Walrus is a large seal-like mammal inhabiting the Arctic seas from Atlantic to the Pacific which forms, like the seal, the food of the Eskimos. Although fossil forms of walrus are known from the Miocene epoch, the living walrus, *Odobenus rosmarus* is the single species of the family *odobenidae*. Male walrus is much larger than the female, reaching a length of 10 feet to 11 feet, and a weight of more than a ton. In both sexes, two large tusks are seen projecting downward from the front of the mouth of each animal. The tusks develop out of the upper canines (Fig. 23). The Pacific race has longer and more slender tusks than the Atlantic race. The walrus subsists primarily on molluscs. The enormous canine tusks are useful in digging and gathering mussels and oysters, and their stout cheek teeth deal effectively with mollusc shells (Romer, 1959).

Tusk of Pig

True pigs have a full set of teeth and large canine tusks which usually curl outward and even upward by the side of the skull. Though short, these sharp tusks are very effective in tearing the adversary. Figure 21 shows a babirusa of Celebes sporting two pairs of tusks. The longer pair from upper jaw have a peculiar way of growth. They turn straight up and pierce through the top of the nose as unusual type of horns (Haltcnorth, 1963). They become functionless as they continue to grow and curve back in a spiral in front of the eyes. The second pair of tusks, the lower canines, is smaller and grows sideways, eventually curving upward. The short-tusked sows bite most other mammals, a rare action in even-toed ungulates. Tusks of male Indian boar may measure one foot and they do not seem to have any commercial importance (Prater, 1965).

Tusk of Narwhal

Narwhal (*Monodon monoceros*) is a small-sized whale of the Arctic which is seldom found south of 65°N. This sea mammal has a characteristic, long, horn-like tusk of same composition as that of the elephant. This straight column developing out of a tooth on the left jaw measures about ten feet although the adult animal's body without the tusk measures only about fifteen feet. Young narwhals possess several small teeth which disappear soon after birth. In the adult, however, there are two unerupted teeth in deep sockets in the skull. The right tooth of the male remains underdeveloped. Since no tusk develops in the female, its two teeth remain underdeveloped. However, occasionally the female also possesses a developed tusk, or still rarely two, as the one exhibited at the Hamburg museum.

As a general rule, the left tooth of the male grows into the forward-directed ivory column bearing prominent grooves and ridges that always twist clockwise (Fig. 25). In exceptional cases when in addition to the tusk on the left side, the right tooth also develops into an additional tusk, the grooves and ridges on the 'extra' tusk surprisingly show left-handed twist.

The function of the narwhal tusk is not clear. It may perhaps serve as a factor in sexual selection similar to the antlers in deer. Earlier it was believed that the narwhal made use of its tusk to break holes in the ice when it came up for air. But scientists have proved this function to be unlikely. Narwhals trapped beneath ice in a bay were found to break the ice with their foreheads rather than the tusks. These mammals were also found to rest by leaning their tusks against the ice, and when disturbed, they used to withdraw the tusk into the water. Sometimes the tusks of narwhals are seen broken, and the ventral cavity of such broken tusks is often filled with the tip of another narwhal. Eskimos are of the opinion that old narwhals with broken tusks feel uncomfortable and get their cavities filled by ramming young narwhals and snapping off their tusks.

The problem of how the clockwise twist is imparted to the narwhal drew the attention of scientists. The mechanism seems different from those operating in snails and other mollusc members and even from the horns of many bovidae. According to D'arcy Thompson (1942), the narwhal's tusk grows continuously from a fleshy pulp in the jaw, and this pulp somehow manages to impart the gyre. The fact that two tusks, as they appear in rare narwhals, show the same kind of twist, the mechanism should be different from that operating in the paired spiral structures in other animals which twist in opposite directions. It may be worth mentioning that the skull of the dolphin is asymmetrical, showing a screw-like twist to the left. The dolphin is known to give a slight twist with every push of its tails. If so, every thrust of narwhal's tail would exert a twisting force on the base of its tusk, a force that would affect the pulp. According to D'arcy Thompson,

during the life time of a narwhal, its rotary swimming motion is sufficient to impart four or five twists to its tusk.

The narwhal's tusk is a heavy and hard ivory that takes good polish. Several fantastic properties have also been attributed to this tusk.

Horn of the Legendary Unicorn

The legend of the unicorn appears in various texts of an ancient book on natural history called the *Bestiary* or sometimes known as the *Physiologus*. According to the legend, the unicorn is a fierce, proud beast that resembles a goat, but possesses only a single straight horn rising from the centre of its brow. It is difficult to hunt the unicorn but there is only one way in which it can be captured. The hunters take a virgin to the forest where the unicorn dwells and leave her there. The unicorn is powerfully attracted to her and lays its head on her lap. Only then can the hunters capture the unicorn.

Scientists began investigating the possible animal that could have been fancied as the unicorn. Shepherd (1967) mentions that a number of real animals such as the rhinoceros and the oryx (African antelope) probably suggested it. The Indian rhino has a single horn, but the African antelope has two horns, in profile they appear like one. The horn, alleged to be of the unicorn, or alicorn is preserved in many places such as the Church of Saint Denis in Paris, the treasures of San Marco in Venice and many royal treasuries throughout Europe. Such horns of unicorn varied in length from 3 feet to 8 feet. They were about 5 inches thick at the base and tapered to a point at the end. Good-sized horns weighed about 15 pounds. On account of the clockwise running grooves on the surface in a low-pitched gyre, the alicorn appears like gigantic screws.

Similar to the rhino horn, the alicorn, partly due to its rarity, was alleged to possess special properties and so became highly priced and rare possessions of the rich. During the 15th and 16th centuries, the alicorn was worth ten times its weight in gold. A specimen of alicorn was considered the second most valuable object among the treasures of Lorenzo the Magnificent, the first being the Farnese cup. Another renowned alicorn was the British Horn of Windsor, which was valued at £100,000, and was preserved as a jewel by Queen Elizabeth. The alicorn was considered a symbol of courage and having miraculous prophylactic properties. It could render any poison harmless. It was a common practice to dip the alicorn into a well or spring to purify the water. Powerful medicinal properties were attributed to the alicorn. Either its powder or water that had touched it could cure many diseases. Disappointingly, by the end of the 16th century, scientists established that the alicorn has no such magical or medicinal properties. Moreover, a rude shock was brought about by the Danish naturalist, Ole Wurm in 1638 on the fact of the horn. He said that the alicorn has nothing to do with any horn, other than the tusk of the arctic whale, the narwhal.

Acknowledgement

All the pen and ink drawings were prepared by Shri S.K. De, Artist of this Institute for which I thank him. The photo of reindeer (Fig. 3) was kindly supplied by Dr. Lutz Heck, Tierpark, Munchen, West Germany.

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(Concluded)

A Rare Animal of the Cat Family—Caracal (*Felis caracal*)

By
ASHOK SINGH

Not many people have seen Caracal (*Felis caracal*) in its natural surroundings. I am one of the fortunate exceptions. The U.P. Forest Department is raising bamboo plantations on a large scale in Mirzapur district. Being directly concerned with this work I have to spend most of my time in the forest areas of the district. Before the actual planting work is done, site clearance is carried out engaging a large number of labourers. Recently, in the last week of January while this work was in progress some of the labourers heard a growl from a nearby bush. As they went nearer, they saw a cat like animal, of about the size of a jackal feasting on hare, with its two cubs. I reached the spot on getting the news but the mother had by then disappeared into the forest leaving behind its two cubs to their fate. One of the cubs had climbed a nearby tree while the other was still hiding in the bush. When approached, the cubs gave a glimpse of their temper, growling in the manner as that of a cat. The cubs were of the size of a domestic cat, and were very playful even in captivity. They were caught with some difficulty. They preyed on rats, mice and unwary small birds that came in the thatched hut in which they were kept for about 25 days. They showed no taste for milk but relished fish. They were finally sent to Kanpur Zoo on the 20th February, 1975.

(Photo on Cover Page)

The endangered *Govialis gangeticus* (Gharial)

The population of the gharial has declined steeply during the last few decades. Hide hunting, human disturbance, habitat alteration, depleted fisheries, taming the rivers for irrigation and hydro-electric generation, use of strong nylon nets for fishing have all contributed to the diminishing numbers of gharials. Small scattered populations still survive in the rivers of North India. The gharial depends on undisturbed embankments for basking and egg laying. It needs free movement over large areas and deep undisturbed pools full of fish for rest and food. The gharial needs immediate protective measures in localities where it is still found to prevent its extinction. It should be protected at the earliest—tomorrow may be too late.

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(See Rule 8)

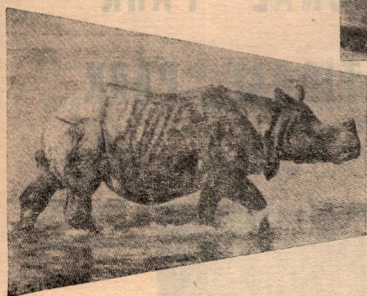
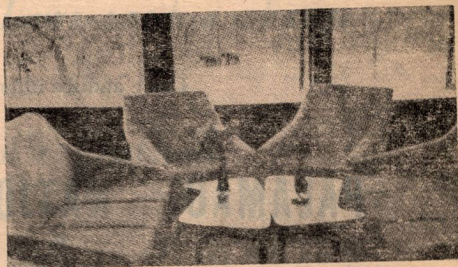
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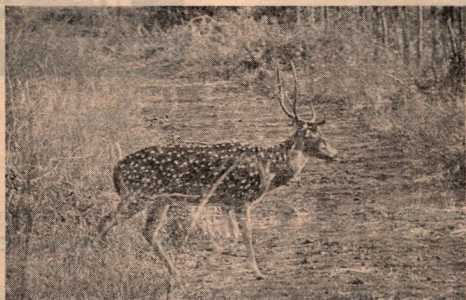
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